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## MODULE CARD AND IT'S MANUFACTURING METHOD

### FIELD OF THE INVENTION

The present invention is related to a module card and it's  
5 manufacturing method, and specially to the module card of a printed  
circuit board (PCB) having golden fingers and the manufacturing  
method.

### BACKGROUND OF THE INVENTION

10 The utility of a module card is very general. It may be used as an  
electronic part or a peripheral device in the computer, communication  
and consumer electronic product domains.

The prior method for manufacturing the module card always packs  
chips as integrated circuits (ICs), then mounts them onto a printed  
15 circuit board (PCB) as a module card by way of surface mount  
technique (SMT). The chip may be a memory element, such as an  
active element of the flash memory. There are golden fingers on the  
module card for inserting into a slot of a computer main-board.  
Certainly, some inactive elements such as resistance, capacitor and  
20 inductor are mounted on the module card.

Please refer to Fig. 1 showing the cleaved view of a prior module  
card. The Golden fingers 15 is used to insert into a slot of a computer  
main-board. There are active elements and inactive elements mounted  
on the module card. The active elements usually are packed as an  
25 integrated circuit 11 (IC). Each IC 11 includes a chip 12. The chip 12  
may be a memory chip, for example a flash memory chip. The pins 13  
of ICs 11 are mounted onto the printed circuit board 14 (PCB) as the

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module card by SMT. There are solder points 17 on the PCB 14 so that the pins of ICs 11 may be mounted onto. The prior arts has the following disadvantages:

1. A chip must be packed as an IC before the IC is mounted onto the PCB, so more steps are needed and the cost in manufacturing and packing will be increased.

2. A module card always includes many ICs so that the ICs must be mounted on the PCB one by one during manufacturing the module card.

3. The cost of SMT is expensive. Special manufacture devices such as a SMT machine and a solder furnace are needed.

4. The module card is manufactured separately so that the throughput is low.

## SUMMARY OF THE INVENTION

An object of the present invention is to provide an module card using the chip-on-board technique to mount chips on a PCB firstly before packing the chips and the PCB for reducing the step of SMT.

Another object of the present invention is to provide the manufacturing method of the module card to reduce the cost.

Another object of the present invention is to provide the manufacturing method of the module card to increase the throughput.

According to the present invention, a manufacturing method of a module card comprises steps of: providing a base board having a golden finger; mounting a chip on the base board for electrically connecting to the golden finger; and forming a packing layer on the chip for forming the module card.

In accordance with one aspect of the present invention, the base board includes a first surface and a second surface for mounting a plurality of the chips on the first surface and the second surface.

5 In accordance with one aspect of the present invention, the base board includes a plurality of package areas for packing a plurality of the module cards once.

In accordance with one aspect of the present invention, the packing layer includes a material of epoxy mold compound.

10 In accordance with one aspect of the present invention, the base board is a circuit board, and the circuit board is a printed circuit board.

According to the present invention, a module card comprises: a base board; a chip mounting on a surface of the base board; a golden finger on the board and electrically connecting to the chip; and a packing layer forming on the chip for covering the chip.

15 In accordance with one aspect of the present invention, the packing layer includes a material of epoxy mold compound.

In accordance with one aspect of the present invention, the surface of the base board includes a first surface and a second surface for packing a plurality of the chips.

20 In accordance with one aspect of the present invention, the module card is double sided.

In accordance with one aspect of the present invention, the base board is a circuit board, and the circuit board is a printed circuit board.

25 The present invention may best be understood through the following description with reference to the accompanying drawings, in which:

## BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a module card cleaved diagram according to the prior arts;

Fig. 2 is a module card cleaved diagram according to the present invention;

5 Fig. 3 is the method for manufacturing a module card according to the present invention;

Fig. 4 is a double sided module card cleaved diagram according to the present invention; and

Fig. 5 is the method for manufacturing a double sided module card  
10 according to the present invention.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Fig. 2 shows the cleaved structure of a module card according the  
15 present invention. It is different to the prior arts that chips 12 are directly mounted onto the PCB 14 by way of chip-on-board technique. Each chip has bond pads for wire bonding so that the metal wires 12 can be connected onto the PCB 14 before forming the packing layer (on packing area 21) on the chips. The packing layer includes the material  
20 of epoxy mold compound. After packing layer is formed, the module card is completed. The steps is simplified. The SMT step is reduced so the speed of manufacturing the module card will be improved, and simultaneously the cost will be reduced.

Fig. 3 shows the steps of manufacturing a batch of module cards.  
25 There are twelve packing areas. Each packing area can be packed a module card. The upper part of the figure is a side view and the lower part is a top view. The packing area are symmetrical each other. The six

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packing areas 21 on left side are connected together, and the six packing areas 21 on right side are also connected together, so the twelve packing areas 12 can be manufactured simultaneously. When the packing layer is covered on the packing areas 12 completely, cutting from the symmetrical lines 32,34,35,36, the twelve module cards will be formed.

Fig. 4 shows the double sided module card cleaved diagram according to the present invention. It is different to Fig. 2 that the chips 12 are mounted onto the first surface 41 and the second surface 42 of the PCB 14. This will improve the utility of the PCB 14, so as to improve the packing density.

Fig. 5 shows the method for manufacturing a double sided module card according to the present invention. The same as Fig. 3, there are twelve packing areas 12 on the base board. After the packing layer are formed on the packing areas 12 completely, the twelve module cards may be cutted down from the symmetrical lines 32,34,35,36.

According to the present invention, the manufacturing method of a module card comprise steps of: providing a base board having a golden finger; mounting a chip on the base board for electrically connecting to the golden finger; and forming a packing layer on the chip for forming the module card. The following steps are mentioned in detail:

(1) Firstly, a PCB 31 is provided. The PCB 31 have two packing areas 21 at least, and the packing areas 21 are symmetrical each other. Each module card has the golden fingers 15.

(2) Secondly, the chips 12 (referring to Fig. 2) are mounted onto the packing areas 21.

(3) The packing layer is formed on the packing areas 21 and the chips 12. At least, two module cards can be produced after cutting the symmetrical lines.

The symmetrical lines may be between two packing areas 21 or two golden fingers 15 area. The packing layer includes the material of epoxy mold compound. For increasing the packing density, the double-sided process as Fig. 4 and Fig. 5 is recommended.

According to the present invention, the following advantages are issued:

10 1. The chips are mounted directly onto the PCB of the module card, so the SMT step is reduced, and the cost is easy to down.

2. The way of batch manufacture improves the throughput specially on the process of the packing layer and golden fingers.

15 3. The double-sided packing technique improves the packing density and the utility of the PCB.

While the invention has been described in terms of what are presently considered to be the most practical and preferred embodiments, it is to be understood that the invention need not be limited to the disclosed embodiment. On the contrary, it is intended to cover various  
20 modifications and similar arrangements included within the spirit and scope of the appended claims which are to be accorded with the broadest interpretation so as to encompass all such modifications and similar structures.